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Prediction of Cricket World Cup 2019 by TOPSIS Technique of MCDM-A Mathematical Analysis

*Muhammad Saqlain, Naveed Jafar, Rashid Hamid, Amir Shahzad

Abstract— Prediction about the result of cricket matches astonishing as a research problem, especially due to its complexity, unpredictable assumption (weather and pitch conditions). Because the ultimate outcome of a cricket match is based on many aspect and unaccepted bearings therefore it is difficult responsibility to predict the exact and partial truth-based outcomes of cricket matches such a research expects a multi criteria decision making approach. TOPSIS to predict true ranking and principally applied to fallouts of CRICKET WORLD CUP 2019. So, by proposed technique, India has the most chances of winning the CWC2019, and the rank of team Pakistan is 7. The team Afghanistan has the lowest chances of winning.

Index Terms— ICC (International Cricket Council), CWC (Cricket World Cup), Cricket, MCDM (Multi Criteria Decision Making), Prediction, TOPSIS, ODI.

1. Introduction and Preliminaries

Cricket began in sixteenth century. In south east of England cricket was originated and in 18th century it became the national sport of England. In 1844 the first international match was played and the first test match was held in 1887. After soccer it is the second most popular game in the world. The cricket world cup has been arranged since every four years. Duckworth [3,4] purposed a model that involve the factors of relationship between the two factors: runs can be scored on average in the remaining innings and number of wickets fallen and scored. Duckworth Lewis method [4] was done by Receiver operating system Curves and Clark [9] used to estimate which team bats first and second. That allowed the calculation at any stage of the innings. Damondaran [6] used stochastic dominance rules to analyze the One Day international performance of India. The first inning score was estimated by optimal scoring rate and chance of winning the match [9]. The framework of cricket for our knowledge was given by cricket prognostic system and to our knowledge [1], no current work has defined the underlying metrics and progression of such models to convey framework for predictions [11]. In one day, international matches of cricket the score of the first innings was predicted on the basis of current run rate it does not matter that wickets fallen and the match venue. In the second innings of the match there is no method to predict the outcome [7]. In the second innings number of wickets and current run rate also matters and the venue also played important role. Above two methods have been implemented by using linear regression and Naïve Bayes Classifier for both innings simultaneously [11].

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According to ODI winnings factor the physical strength and scoring depends a lot [10]. The home venue has the main advantage and in ODI cricket it is the tool of the victory [10]. It can accordingly be helpful in adjusting certain factors in order to maximize the chances of winning the real game [12] [13].

2. Material and Method

The 12th version of the World Cup is nearest to the conclusion and some of the best players of Cricket teams have graced the stage in England with 14 teams taking part. Data is collected up to 10th November 2018, after the WC 2015 of the following teams:

A_1 = Pakistan

A_2 = India

A_3 = Afghanistan

A_4 = New Zealand

A_5 = England

A_6 = South Africa

A_7 = Australia

A_8 = West Indies

A_9 = Bangladesh

2.1 Statistics

The World Cup is nearest to the conclusion and some of the best players of Cricket teams have graced the stage in England with 14 teams taking part. Following attributes are considered in the calculations which plays important role in each game:

C_1 = Centuries (After WC 15)

C_2 = Fifties (After WC 15)

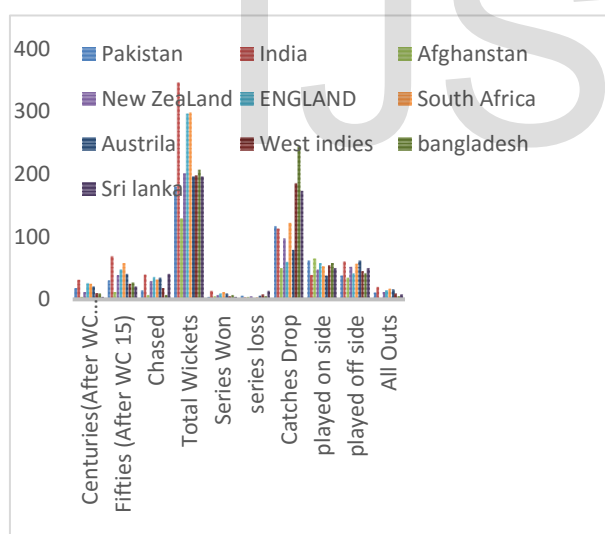
C_3 = Chased

C_4 = Total Wickets

C_5 = Series Won
 C_6 = series loss
 C_7 = Catches Drop
 C_8 = played on side
 C_9 = played off side
 C_{10} = All Out

Table 1: Attribute values collected up to 10th November 2018.

Teams	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Pakistan	18	30	15	179	4	6	116	62	38	11
India	31	69	40	346	14	3	113	39	61	20
Afghanistan	4	12	7	129	5	4	50	65	35	2
New Zealand	12	39	29	201	7	5	97	48	52	12
ENGLAND	26	48	36	296	9	0	60	58	42	15
South Africa	25	58	32	298	12	3	122	53	57	17
Australia	21	41	35	196	9	6	79	38	62	16
West indies	10	25	18	198	5	8	185	55	45	9
Bangladesh	9	27	7	206	7	5	243	58	42	5



Graph 1: Graphical Representation of Collected statistics shown in table1.

3. Calculations

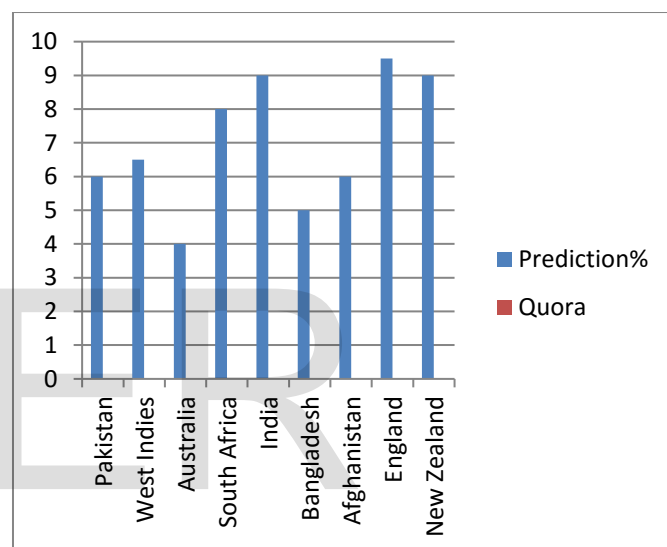
There is a great demand of sports prediction system and there is a great role of data analysis in prediction [14]. In prediction of sports, like in tennis the next shot location, in Olympics the performance of athlete, the frequency of dunk shots and etc. There are many factors that can affect the conclusion of a cricket match so the cricket prediction is comparatively difficult [15]. Earlier were only the following factors dependable on result of any match

i.e. venue, weather, stadium size, captaincy etc. In reality, amongst all sports activities, cricket forecast is one of the broadly and intensely investigated range. Therefore, to the expectation linked with the researches for cricket; a prediction consultant of the cricket expected the winner of WC 2019.

Table 2: Prediction Percentage by Quora

Team	A_1	A_8	A_2	A_7	A_6	A_9	A_3	A_5	A_4
Prediction %	6	6.5	4	8	9	5	6	9.5	9
By Quora									

Graph 2: Graphical representation of prediction percentage by Quora



3.1.1 Prediction by TOPSIS Technique

The calculated records related to matches from all the group level of the 2019 cricket world cup, which were easily reachable from the ICC website (ICC, 2019), were studied. To impose the MCDM technique, the followings behavior of the games was arranged by team during each match: centuries, fifties, chased target, wicket, played on side, played off side, all outs, no balls, free hits, wide, byes, leg byes, run outs, LBW outs and boundaries in every played in countries. To apply technique for order preference by similarity to ideal solution (TOPSIS) as a multi-criteria decision-making tool to form the all-time best one-day cricket team.

3.1.2 TOPSIS Method

Step-1 Calculate Normalized Matrix

$$X_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}}$$

Step-2 Calculate weighted normalized Matrix

$$V_{ij} = X_{ij} \times W_j$$

Step-3 calculates the ideal worst and ideal worst

value.

Step-4 calculates the Euclidean distance from the ideal best.

$$S_i^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2} \quad i = 1, 2, 3, \dots, m$$

Step-5 Calculate the Euclidean distance from the ideal worst.

$$S_i^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2} \quad i = 1, 2, 3, \dots, m$$

Step-6 Calculate performance score.

$$C_i^* = \frac{S_i^-}{(S_i^+ + S_i^-)}$$

3.1.3 Attribute values by Sport Experts

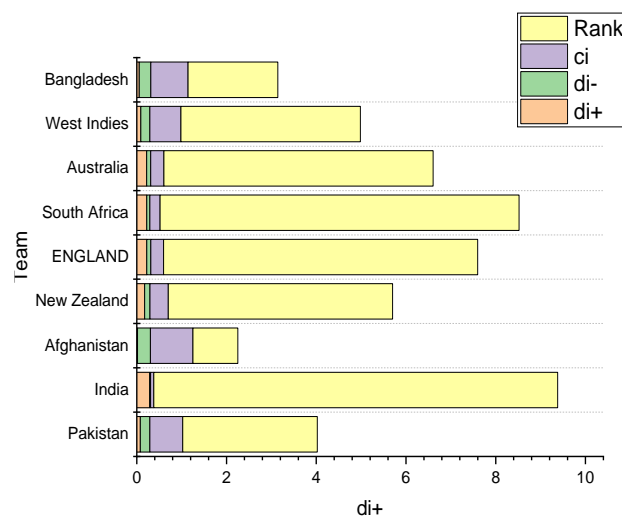
Table 3: Attribute values

Attributes	C_1	C_2	C_3	C_4	C_5
Weights	0.04	0.3	0.4	0.01	0.02
Attributes	C_6	C_7	C_8	C_9	C_{10}
Weights	0.025	0.044	0.0234	0.1330	0.0046

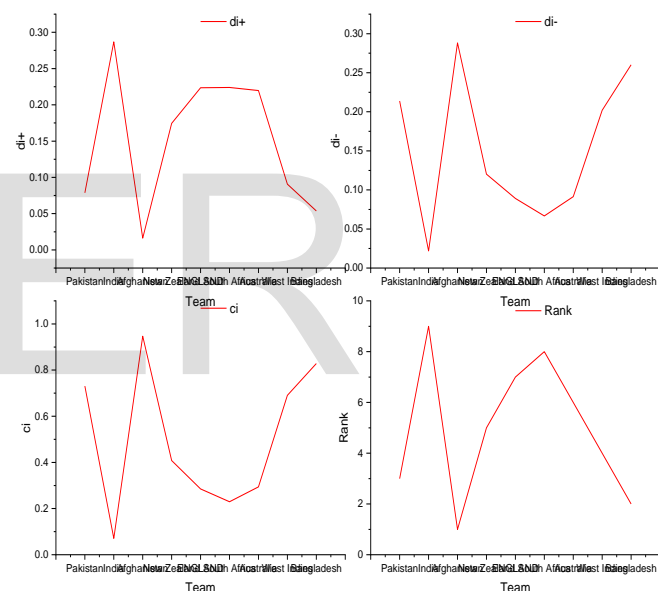
By considering attribute weights and alternatives statistics, and following TOPSIS technique steps, we get table 4. And results are arranged in ascending order.

Table 4: TOPSIS technique result after calculations

CWC 2019 MATHEMATICALLY				
di+	di-	ci	Rank	Team
0.286955	0.021924	0.070979	1	India
0.223999	0.066649	0.229312	2	South-Africa
0.223642	0.089076	0.284845	3	England
0.219705	0.091363	0.293706	4	Australia
0.174371	0.120149	0.40795	5	New-Zealand
0.090572	0.201972	0.690399	6	West-Indies
0.078642	0.213814	0.731098	7	Pakistan
0.053803	0.260126	0.828615	8	Bangladesh
0.016133	0.288277	0.947003	9	Afghanistan



Graph 3: Graphical representation of results



Graph 4: Graphical representation of result obtained in step 6 of TOPSIS

4. Result Discussion and Conclusion

The main goal of this study was to predict the CRICKET WORLD CUP 2019 based on current match statistics. Since the conditional result of a cricket match is related to many cause and unpredictable situation. Therefore, it is difficult responsibility to predict the exact and partial truth-based outcomes of cricket matches such a research expects a multi criteria decision making approach, TOPSIS to predict true ranking and principally applied to fallouts of CRICKET 2019 WORLD CUP. So, by the calculations, India has the most chance of winning the CWC2019. The Team Afghanistan has the lowest chances of winning.

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